



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,401	01/31/2002	David K. Lambert	DP-301550	6074

7590

04/23/2003

JIMMY L. FUNKE  
DELPHI TECHNOLOGIES, INC.  
Legal Staff Mail Code CT10C  
P.O. Box 9005  
Kokomo, IN 46904-9005

EXAMINER

SMITH, RICHARD A

ART UNIT

PAPER NUMBER

2859

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/059,401

Applicant(s)

LAMBERT ET AL.

Examiner

R. Alexander Smith

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

Art Unit: 2859

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim 16: "the triangular cross section" lacks antecedent basis and is indefinite because it is unclear as to what structure or element that this limitation is drawn.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2859

4. Claims 1-3, 5-7, 10, 14-16, 19, 21, 22, 24 and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 4,754,139 to Ennulat et al.

Ennulat et al. discloses an infrared sensor, including an absorber (4), a plurality of reflecting surfaces (on 1) disposed about the circumference of each absorber; the reflective surfaces define a light collecting region (9), each reflective surface being disposed at an obtuse angle relative to the light collecting region; a membrane (8) for thermally isolating the frame from the absorber, the membrane being supported by the frame and lying in the light collecting region and having the absorber disposed thereon; the detector extending between the frame and the absorber (by means of the detector itself and leads 11); reflective surfaces are coated with a metal film (column 4, lines 51-58 and in particular lines 57-58); the reflective surfaces define a cavity (9) having a substantially rectangular cross section; the reflective surfaces being disposed on a light concentrator (1); the light concentrator being micromachined and including 1st and 2nd parallel segments, a 3rd segment connected between one end of each 1st and 2nd segments and being at right angles, and a 4th segment connected between the other ends of each 1st and 2nd segment and being at right angles, the 4th segment being parallel to the 3rd segment (see 1 and 9 of figure 1); below a circuit board (3 with 2) having a void (14) and the absorber being disposed adjacent the void; the absorber being mounted to the membrane which spans the opening, each reflective surface having one edge adjacent the perimeter of the opening and an opposite edge offset outwardly from the perimeter of the opening; the frame defines a rectangular opening having a perimeter, the frame including four segments disposed about the perimeter wherein each segment has an inner side defining one of the reflective surfaces; the inner side extending from adjacent the perimeter of the opening to an apex of the triangular cross section. Ennulat et al. discloses that the detector of the present invention is compatible with any number of well-known thermal sensitive devices (column 3, lines 30-37) including thermocouples.

With respect to each of the segments includes an inward side and an outward side, the reflective surfaces being disposed on the inward side of the segments: Ennulat et al. discloses this limitation since for each absorber 4, the inward side would be those segments which bound that

Art Unit: 2859

particular absorber in order to reflect light to that particular absorber, the outward segments would be those segments which face the edge of the circuit board or face another of the absorbers as shown in figure 1.

With respect to claimed limitations of i) the frame supporting the absorber and including the reflecting surfaces, ii) the frame includes a body for supporting the absorber and for attaching the light concentrator, iii) the frame being mounted to the circuit board, and iv) the frame defining an opening and including four side walls defining a cavity: Ennulat et al. discloses that the invention includes the light concentrators and a detector support structure for supporting the absorber and the relationship between these two must be maintained. Ennulat et al. further discloses that the light concentrator and detector support structure can be used within any number of well-known thermal sensitive devices (column 3, lines 30-37). Therefore, the generic limitations involving the frame, as claimed by Applicant, are considered by the Examiner as anticipated by Ennulat et al. since a frame to support the concentrators, the membrane and the absorber are inherently necessary.

With respect to the frame including a body for supporting the absorber: this limitation is met when the frame body supports the absorber indirectly via the integrated circuit 3 and the detector support structure 2, or when the frame body supports the absorber directly via inclusion of the integrated circuit 3 and the detector support structure 2.

With respect to claimed limitations of the frame being mounted to the circuit board, the frame defining an opening and including four side walls defining a cavity: these limitations are met when the frame includes the integrated circuit 3 and the detector support structure 2.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2859

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 4, 20, 33-40 and 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al. in view of U.S. 6,335,478 to Chou et al.

Ennulat et al. teaches all that is claimed as discussed in the above rejections of claims 1-3, 5-7, 10, 14-16, 19, 21, 22, 24 and 28-30 except for the thermocouple being a plurality of series connected thermocouples and each of the thermocouples having a Seebeck voltage which depends upon temperature difference and the micromachined light concentrator being of silicon.

Chou et al. discloses a thermocouple being a plurality of series connected thermocouples in order to increase the voltage generated and that each of the thermocouples have a Seebeck voltage which depends upon temperature difference are commonly available (column 1, lines 18-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the thermocouple absorber, taught by Ennulat et al., by making it a thermopile using Seebeck voltage, as taught by Chou et al., in order to increase the output voltage and to use commonly available thermocouples to save on costs.

Art Unit: 2859

With respect to the micromachined light concentrator being of silicon in claim 38: The Applicant's limitations regarding micromachined light concentrator being of silicon is only considered to be the use of "optimum" or "preferred" materials that a person having ordinary skill in the art at the time the invention was made using routine experimentation would have found obvious to provide to make the concentrator disclosed by Ennulat et al. since they are well known types of materials used to make circuit board related elements and since it has been held to be a matter of obvious design choice and within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of the invention. In re Leshen, 125 USPQ 416. In this case, to use conventional techniques and materials for circuit board related construction.

7. Claims 8, 9 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al.

Ennulat et al. teaches all that is claimed as discussed in the above rejections of claims 1-3, 5-7, 10, 14-16, 19, 21, 22, 24 and 28-30 except for the micromachined light concentrator being of silicon.

The Applicant's limitations regarding micromachined light concentrator being of silicon is only considered to be the use of "optimum" or "preferred" materials that a person having ordinary skill in the art at the time the invention was made using routine experimentation would have found obvious to provide to make the concentrator disclosed by Ennulat et al. since they are well known types of materials used to make circuit board related elements and since it has been held to be a matter of obvious design choice and within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use of the invention. In re Leshen, 125 USPQ 416. In this case, to use conventional techniques and materials for circuit board related construction.

Art Unit: 2859

8. Claims 17 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al. in view of U.S. 5,910,659 to Johnson et al.

Ennulat et al. teaches all that is claimed as discussed in the above rejections of claims 1-3, 5-7, 10, 14-16, 19, 21, 22, 24 and 28-30 except for each segment inner side having a chamfered edge disposed adjacent the perimeter, and the corresponding reflective surface ending at the chamfered edge.

Johnson et al. discloses an infrared heater and that the invention involving the heater can be used in sensors (column 9, lines 55-62). This heater employs a frame (100, 200, 300) with a body, a membrane (110), a heater (105) mounted on the membrane, a light decorrelator (210) defining a light decorrelation region (205). The infrared heater can be part of an array or used individually, and that the light decorrelator can be mounted indirectly to a frame which includes the body 100 leaving a gap d (e.g., see the gap d shown in figure 3), or the light decorrelator can be mounted directly to the frame (e.g., see figure 7 and column 9, lines 32-43). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the infrared sensor, taught by Ennulat et al., with the direct mounting, as taught by Johnson et al., in order to directly mount the concentrator to the frame or body which supports the membrane and the absorber.

With respect to the chamfered edge adjacent the perimeter: the chamfered edge, without any criticality, is only considered to be an obvious modification of the base disposed adjacent the perimeter of the opening, because the courts have held that a change in shape or configuration, without any criticality, is within the level of skill in the art as the particular shape claimed by Applicant is nothing more than one of numerous shapes that a person having ordinary skill in the art will find obvious to provide. In re Dailey, 149 USPQ 47 (CCPA 1976). In this case, to mount the concentrator directly on the frame and body and to provide a shape to the edges that will help prevent chipping and damage of the edges from accidents during construction or from thermal changes during use.



Art Unit: 2859

With respect to the reflective surface ending at the chamfered edge: It would be obvious with respect to ending the reflective surface at the chamfered edge as being merely manufacturing choices based on the preferences of the user or manufacturer. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to end the reflective surface at the chamfered edge as claimed with the infrared sensor, taught by Ennulat et al. as modified by Johnson et al., based on preferences of a user or manufacturer. In this case to save costs by not providing the reflective surface on surfaces where it will not reflect to the absorber.

9. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al. and Chou et al. as applied to claims 4, 20, 33-40 and 44-46 above, and further in view of U.S. 5,910,659 to Johnson et al.

Ennulat et al. and Chou et al. teach all that is claimed as discussed in the above rejections of claims 4, 20, 33-40 and 44-46 except for each segment inner side having a chamfered edge disposed adjacent the perimeter, and the corresponding reflective surface ending at the chamfered edge.

Johnson et al. discloses an infrared heater and that the invention involving the heater can be used in sensors (column 9, lines 55-62). This heater employs a frame (100, 200, 300) with a body, a membrane (110), a heater (105) mounted on the membrane, a light decorrelator (210) defining a light decorrelation region (205). The infrared heater can be part of an array or used individually, and that the light decorrelator can be mounted indirectly to a frame which includes the body 100 leaving a gap d (e.g., see the gap d shown in figure 3), or the light decorrelator can be mounted directly to the frame (e.g., see figure 7 and column 9, lines 32-43). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the infrared sensor, taught by Ennulat et al. and Chou et al., with the direct mounting, as taught by Johnson et al., in order to directly mount the concentrator to the frame or body which supports the membrane and the absorber.

Art Unit: 2859

With respect to the chamfered edge adjacent the perimeter: the chamfered edge, without any criticality, is only considered to be an obvious modification of the base disposed adjacent the perimeter of the opening, because the courts have held that a change in shape or configuration, without any criticality, is within the level of skill in the art as the particular shape claimed by Applicant is nothing more than one of numerous shapes that a person having ordinary skill in the art will find obvious to provide. In re Dailey, 149 USPQ 47 (CCPA 1976). In this case, to mount the concentrator directly on the frame and body and to provide a shape to the edges that will help prevent chipping and damage of the edges from accidents during construction or from thermal changes during use.

With respect to the reflective surface ending at the chamfered edge: It would be obvious with respect to ending the reflective surface at the chamfered edge as being merely manufacturing choices based on the preferences of the user or manufacturer. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to end the reflective surface at the chamfered edge as claimed with the infrared sensor, taught by Ennulat et al. and Chou et al. as modified by Johnson et al., based on preferences of a user or manufacturer. In this case to save costs by not providing the reflective surface on surfaces where it will not reflect to the absorber.

10. Claims 11, 13, 18, 25, 27 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al. in view of U.S. 5,962,854 to Endo.

Ennulat et al. teaches all that is claimed as discussed in the above rejections of claims 1-3, 5-7, 10, 14-16, 19, 21, 22, 24 and 28-30 except for a silicon window attached to the frame, extending between the reflective surfaces and enclosing the absorber; the silicon window extending between the side walls and being parallel to the bottom wall; a silicon window being mounted to the top surfaces of the segments.

Art Unit: 2859

Endo discloses that an infrared sensor having a silicon window and an antireflection coating on the window (column 18, lines 3-22) to enclose the area of the thermopile. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the window and the antireflection coating, as suggested by Endo, to the sensor and its top surfaces, extending between the reflective surfaces and to enclose the absorber, taught by Ennulat et al., in order to protect the sensor from outside contaminants, to provide a surface for attaching an anti-reflective coating, and to minimize reflections.

11. Claims 41, 43 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al. and Chou et al. as applied to claims 4, 20, 33-40 and 44-46 above, and further in view of U.S. 5,962,854 to Endo.

Ennulat et al. and Chou et al. teach all that is claimed as discussed in the above rejections of claims 4, 20, 33-40 and 44-46 except for a silicon window attached to the frame, extending between the reflective surfaces and enclosing the absorber; the silicon window extending between the side walls and being parallel to the bottom wall; a silicon window being mounted to the top surfaces of the segments.

Endo discloses that an infrared sensor having a silicon window and an antireflection coating on the window (column 18, lines 3-22) to enclose the area of the thermopile. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the window and the antireflection coating, as suggested by Endo, to the sensor and its top surfaces, extending between the reflective surfaces and to enclose the absorber, taught by Ennulat et al. and Chou et al., in order to protect the sensor from outside contaminants, to provide a surface for attaching an anti-reflective coating, and to minimize reflections.

Art Unit: 2859

12. Claims 12 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al. and Endo as applied to claims 11, 13, 18, 25, 27 and 32 above, and further in view of U.S. 6,107,925 to Wong.

Ennulat et al. and Endo together teach all that is claimed as discussed in the above rejections of claims 11, 13, 18, 25, 27 and 32 except for an interference filter.

Wong discloses that an infrared sensor having a window with interference filters in order to allow the band of radiation desired through the window (column 18, lines 28-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the interference filter, as suggested by Wong, to the inside of the window, taught by Ennulat et al. and Endo, in order to allow the bands of radiations desired through the window.

13. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ennulat et al., Chou et al. and Endo as applied to claims 41, 43 and 48 above, and further in view of U.S. 6,107,925 to Wong.

Ennulat et al., Chou et al. and Endo together teach all that is claimed as discussed in the above rejections of claims 41, 43 and 48 except for an interference filter.

Wong discloses that an infrared sensor having a window with interference filters in order to allow the band of radiation desired through the window (column 18, lines 28-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the interference filter, as suggested by Wong, to the inside of the window, taught by Ennulat et al., Chou et al. and Endo, in order to allow the bands of radiations desired through the window.

Art Unit: 2859

*Conclusion*

14. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure. The prior art cited in PTO-892 and not mentioned above disclose related sensors.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Smith whose telephone number is (703) 305-0647. The examiner can normally be reached on Monday-Friday from 9:00 AM to 5:30 PM.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800

RAS  
April 21, 2003